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by different authors been regarded as a vertebrate, a mollusk, as well as a crustacean, has been greatly needed. Dr. Oscar Hertwig is so excellent a histologist and anatomist, that we may feel sure that this investigation has been made with the same exactitude which has characterized his previous labors on the lower animals. Our knowledge of *Sagitta* had already been greatly extended by the researches of Krohn and Kowalevsky, and owing to the results reached by them, no one now doubts but that *Sagitta* is a worm (Vermes), though its place among the classes of Vermes is uncertain. Hertwig concludes that it agrees best with the Nematodes and Annelides.

WADSWORTH'S GEOLOGICAL PAPERS.<sup>1</sup>—These papers by Prof. Wadsworth are, like all the preceding writings of this author, of the most thorough character. He has made the microscopic study of igneous and metamorphic rocks a special study for several years, and by his thoroughness has elevated this department of geology very nearly to an exact science. The first paper, on the geology of Lake Superior, is the most important one, and contains six effective octavo plates, showing the relations of the different kinds of rocks to each other; the dykes, bands of iron ores, jasper veins, felsites, diorites are clearly shown in their relations to each other in the rock masses. Mr. Wadsworth has not relied on the microscope alone, but has given many important chemical analyses of minerals. The historical account of the explorations of others in that region, with the bibliography at the end of the memoirs, is very valuable. We wish we could quote largely from these papers, but space will not permit.—*F. V. H.*

PHYSICAL AND GEOLOGICAL RESULTS OF THE FRENCH EXPEDITION TO OBSERVE THE TRANSIT OF VENUS.<sup>2</sup>—These beautiful volumes are a portion of the results of the French Expedition to observe the Transit of Venus. The first part deals with the physical results of the expedition, printed in fine clear type with eighteen excellent plates, a portion of them photographic. The

<sup>1</sup> *Notes on the Geology of the Iron and Copper Districts of Lake Superior.* By M. E. Wadsworth. Bulletin of the Museum of Comparative Zoölogy at Harvard College, Whole Series, Vol. VII. (Geological Series, Vol. I). pp. 157, with 6 plates.

*On the Elongation and Plasticity of Pebbles in Conglomerates.* By M. E. WADSWORTH. (From the Proceedings of the Boston Society of Natural History, Vol. XX, Nov. 5, 1879.)

*Danalite from the Iron Mine, Bartlett, New Hampshire.* By M. E. WADSWORTH.

*Picrolite from a Serpentine Quarry in Florida, Mass.* By M. E. WADSWORTH.

<sup>2</sup> *Mission de l'Isle Saint-Paul Observations Astronomiques, opérations photographiques, observations magnetiques et hydrographie.* Institut de France. Academie des Sciences. Recueil de memoires a l'observation du passage de Venus sur le Soleil. (Extrait du tome II, 1st partie.) 425 pp., 4to, 18 plates and maps.

*Recherches Geologiques faites, a Aden, a la Reunion, aux Isles Saint Paul et Amsterdam, aux Seychelles.* Par M. CH. VELAIN, Maitre de conferences a la Sorbonne. 460 pp., 4to, 25 plates and maps. (Extrait du tome II, 2d partie.) Paris, 1879.

engravings are good, showing with great detail the surface features of the island, pictorially and topographically. But to the naturalist and geologist, the second part, by M. Velain, is of greater interest. This volume is illustrated with twenty-seven quarto plates, eight of which are by the photoglyptic process, and are microscopic studies of the volcanic rocks. The island itself is of volcanic origin, and entirely composed of igneous rocks. This volume is a most elaborate monograph of the mineralogical and structural history of the island, by means of sections and colored maps, and it certainly is a model of careful study and bookmaking. Many actual volcanoes are shown to exist on the island, in operation at the present time. The publication of these important volumes is very creditable to the Government of France as well as to the authors.

M. Velain has recently published a small brochure of great interest in Bulletin No. 7 of the Mineralogical Society of France, on the microscopic study of the glass or slag resulting from the fusion of the ashes of grasses. It is illustrated with an excellent octavo plate showing the production, artificially, of the crystals of tridymite, anorthite, wollastonite and augite.—*F. V. H.*

SIGSBEE'S DEEP SEA SOUNDING AND DREDGING.<sup>1</sup>—It is greatly to the credit of American science and to our government, that it has taken so prominent a part in deep sea explorations. This is due largely to the labors and energy of the lamented Count Pourtales, who was a distinguished physical geographer and for a long time an assistant in the U. S. Coast Survey. He was the first to show that the warmer waters of the tropics, notably the Floridan seas, with their profusion of tropical life, were underlaid by a colder bottom stratum of water with a nearly equal profusion of what was hitherto supposed to be purely Arctic life. The Norwegian marine zoölogists had previously demonstrated the existence of a deep-sea fauna off the coast of Norway, and the Swedish naturalist, Lovén, had suggested that this deep sea fauna was widespread over the ocean bottom, but Pourtales demonstrated it, and the subsequent deep sea explorations of the English Navy, especially the Challenger Expedition, carried out and extended Pourtales' discoveries.

Pourtales was aided and advised by his friend Agassiz, and the work of exploration of the ocean bottom under the Gulf Stream off the Floridan peninsula, and in the Gulf of Mexico, as well as off the southern coast of the United States, has of late years been extended by the officers of the U. S. Coast Survey, Mr. Alexander Agassiz being the naturalist of the recent expeditions. The Coast Survey has now a beautiful steamer, the *Blake*, of 350 tons,

<sup>1</sup> *United States Coast and Geodetic Survey*. CARLISLE P. PATTERSON, Superintendent. Deep sea Sounding and Dredging. A description and discussion of the methods and appliances used on board the Coast and Geodetic Survey Steamer *Blake*. By CHARLES D. SIGSBEE, U.S.N. Washington, D. C., 1880. 4to, pp. 192.